2018

Data Utilization

Elizabeth Hawkins
The Ohio State University

John Fulton
The Ohio State University

Richard Colley III
The Ohio State University

Jenna Lee
The Ohio State University

Laura Thompson
University of Nebraska - Lincoln

See next page for additional authors

Data Utilization

Abstract
Goal: Understand potential ways digital agriculture data and tools can be implemented at the farm level to manage risk, maximize profits and optimize inputs.

Disciplines
Agricultural Economics | Agricultural Education

Authors
Elizabeth Hawkins, John Fulton, Richard Colley III, Jenna Lee, Laura Thompson, Joe Luck, Daniel Barker, Ignacio Ciampitti, Ajay Sharda, and Luciana Nieto

Data Utilization

By Elizabeth Hawkins, Laura Thompson, Joe Luck, Daniel Barker, Ignacio Ciampitti, Ajay Sharda, Luciana Nieto, John Fulton, Richard Colley III and Jenna Lee

TECH TOOLSHED

GOAL	Understand potential ways digital agriculture data and tools can be implemented at the farm level to manage risk, maximize profits and optimize inputs.
VALUE STATEMENT	Improved decision making can help optimize farm management, whether that be through risk management, increased profits or reduced inputs. Data, when properly collected and interpreted, can help to identify and understand management opportunities.

Data utilization is the process of creating usable information or knowledge from your data. While farmers may already be collecting data, it has no value to their operation until it is put into a format that provides some form of visualization, and enables analysis that will drive further action. Many digital tools are available that consume agricultural data and synthesize it to create value.

TURNING DATA INTO DECISIONS

Data is a tool. When used correctly, data can provide insights that improve farm management.

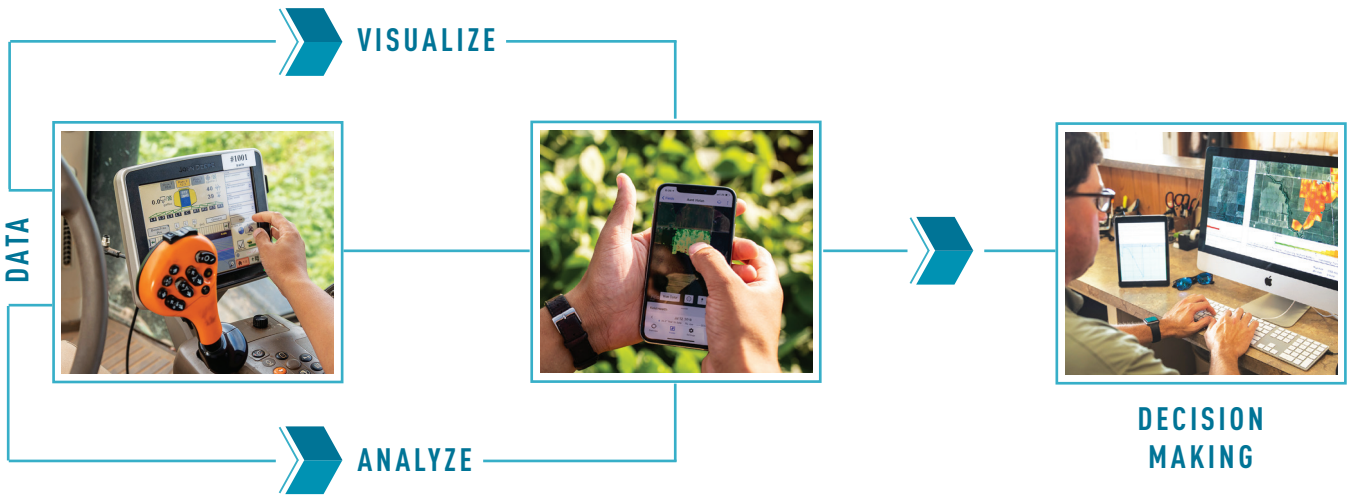

Figure 1.
Data utilization is achieved when data is used to generate information, by visualization and/or analytics, and a management decision is reached using the knowledge gained. Depicted are examples of each category, including collection of spatial data, visualization and/or analytics of as-planted data and data-based decision making assisted by farm management software.

Digital Tools

The categories shown below are a representation of the six main types of currently available digital tools. Each category leads to a successful piece of data utilization, and some digital tools and services fall into more than one category, each of which are described below. Depending on the operation, it is likely that more than one digital tool or service will need to be employed to make the most of agricultural data.

1 Data Warehousing

Data warehousing tools facilitate the storage of agriculture data and often include data sharing and organization features.

2 Production Benchmarking

Production benchmarking tools provide the opportunity for farmers to benchmark themselves against other similar operations and give comparative insights regarding agronomic response, yield, costs and profit margins.

3 Production Analysis

Analysis tools are utilized by farmers to analyze their production data (agronomic, machine, imagery, etc.) and to give information permitting insights to support decisions.

4 In-Season Monitoring

In-season monitoring tools facilitate monitoring of crop health, development and stress during the growing season.

5 Crop Modeling

These tools feature estimates of crop needs (i.e., nutrients) and crop development, providing information to make in-season decisions and end-of-year grain yield predictions.

6 Recommendations

Most recommendation tools supply the capability to link farmers to their trusted consultants and advisors, so they can support the recommendation process.

Insights for Decision Making

Regardless of the types of tools you choose to use, the primarily goal of data utilization remains the same: bring value back to the farm operation. By using data to inform decision making, you can select management strategies that have the potential to manage risks, maximize profits and/or optimize inputs. The following are brief descriptions of management strategies that use data to achieve these goals.

MANAGE RISKS

Pre-plant applied nitrogen comes with a high risk of loss to the environment through denitrification and leaching. Later in-season nitrogen applications, combined with aerial imagery that can be used to assess crop nitrogen needs, can increase nitrogen use efficiency and reduce the risk of nitrogen loss.

MAXIMIZE PROFITS

In-season crop management, like fungicide applications, can be costly. Georeferenced scouting can help provide information to help target acres where these applications will be economical and avoid acres where disease thresholds are not met.

OPTIMIZE INPUTS

Information from on-farm seeding rate trials can be used to generate variable rate seeding prescriptions. By matching seeding rates to observed yield potential zones, farmers can potentially decrease seed cost.

For more information and links to additional resources, visit www.unitedsoybean.org/techtoolshed

Technical editing for this publication was led by Elizabeth Hawkins, John Fulton, Ph.D., Richard Colley III and Jenna Lee, The Ohio State University, Laura Thompson and Joe Luck, Ph.D., University of Nebraska-Lincoln, Daniel Barker, Ph.D., Iowa State University, and Ignacio Ciampitti, Ph.D., Ajay Sharda, Ph.D., and Luciana Nieto, Kansas State University.